

Conductivity of Diamond Surfaces: Sensor Applications



Hydrogen-terminated diamond exhibits a p-type surface layer that is modulated by adsorbates from the ambient environment. The surface conductivity depends on the relative positions of the Fermi levels in the diamond and in the adsorbed film. Changes in conductivity can be extreme and are reversible. For example, the conductivity changes by several orders of magnitude when exposed to HCl and NH_3 vapors as shown in the figure. We are examining ways to exploit this phenomenon for a novel class of robust, real-time sensors for chemical and biological agents.

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